

## Claims

Sub 12

1. An electric power unit for electric discharge surface treatment by which electric discharge is generated between an electrode for electric discharge surface treatment and a workpiece so that a hard coat is formed on a surface of the workpiece by the energy of electric discharge, the electric power unit for electric discharge surface treatment comprising: a control means for dividing an electric discharge current pulse into a first pulse width  $T_1$  (first peak value  $I_{p1}$ ), a second pulse width  $T_2$  (second peak value  $I_{p2}$ ), . . . , and an  $n$ -th pulse width  $T_n$  ( $n$ -th peak value  $I_{pn}$ ) ( $n$  is an integer 2 and more), the control means for setting the first pulse width  $T_1$  and the first peak value  $I_{p1}$  so that an electric current density between the electrodes can be in a predetermined range to suppress the emission of electrode material, the control means for setting the  $k$ -th pulse width  $T_k$  and the  $k$ -th peak value  $I_{pk}$  ( $2 \leq k \leq n$ ,  $k$  is an integer) so that a quantity of supply of hard coat material by the emission of electrode material can be a predetermined value determined according to a predetermined processing condition.

2. A method of electric discharge surface treatment for forming a hard coat on a surface of a workpiece by which electric discharge is generated between an electrode for electric discharge surface treatment and the workpiece

so that the hard coat is formed on the surface of the workpiece by the energy of electric discharge, the method of electric discharge surface treatment comprising the steps of: dividing an electric discharge current pulse into a first pulse width  $T_1$  (first peak value  $I_{p1}$ ), a second pulse width  $T_2$  (second peak value  $I_{p2}$ ), . . . , and an  $n$ -th pulse width  $T_n$  ( $n$ -th peak value  $I_{pn}$ ) ( $n$  is an integer 2 and more); setting the first pulse width  $T_1$  and the first peak value  $I_{p1}$  so that an electric current density between the electrodes can be in a predetermined range to suppress the emission of electrode material; and setting the  $k$ -th pulse width  $T_k$  and the  $k$ -th peak value  $I_{pk}$  ( $2 \leq k \leq n$ ,  $k$  is an integer) so that a quantity of supply of hard coat material by the emission of electrode material can be a predetermined value determined according to a predetermined processing condition.

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